1. (Amended) A method for controlling the drive energy of an ink jet print apparatus wherein a print element is driven to eject an ink from an ink jet print head to a printing medium for performing printing, the method comprising:

a first step for supplying a plurality of different drive energies successively to the ink jet print head;

a second step for monitoring temperature of the ink jet print head according to the supply of the drive energy in each supply of the plurality of different drive energies;

a third step for judging a threshold drive energy required for ink ejection of the ink jet print head using a value for each supplied drive energy and a value for each monitored temperature;

a fourth step for determining a drive condition for ejecting ink on the basis of the threshold drive energy; and

a fifth step for driving the print element on the basis of the determined drive condition.

2. (Amended) A method for controlling the drive energy of an ink jet print apparatus according to claim 1, wherein in said first step, a difference in the amount of each drive energy supplied to the ink jet print head is generated by changing a pulse width of a drive pulse signal applied to the print element.

3. (Amended) A method for controlling the drive energy of an ink jet print apparatus according to claim 1, wherein in said first step, an initial drive energy

supplied is determined on the basis of drive condition information stored in the ink jet print head.

4. (Amended) A method for controlling the drive energy of an ink jet print apparatus according to claim 1, wherein in said fifth step, the determined drive condition is compared with drive condition information stored in the ink jet print head, and when both are different, the drive energy to drive the print element is changed.

5. (Amended) A method for controlling the drive energy of an ink jet print apparatus according to claim 1, wherein in said fifth step, when the determined drive condition is different from drive condition information stored in the ink jet print head, the drive condition information stored in the ink jet print head is updated with the determined drive condition data.

6. (Amended) A method for controlling the drive energy of an ink jet print apparatus wherein a print element is driven to eject an ink from an ink jet print head to a printing medium for performing printing, the method comprising:

a first step for supplying a plurality of different drive energies successively to the ink jet print head;

a second step for monitoring temperature of the ink jet print head according to the supply of the drive energy in each supply of the plurality of different drive energies;

a third step for determining a drive condition for ejecting ink using a value for each supplied drive energy and a value for each monitored temperature; and

a fourth step for driving the print element on the basis of the determined drive condition.

7. (Amended) An ink jet print apparatus wherein a print element is driven to eject an ink from an ink jet print head for performing printing, the ink jet print apparatus comprising:

first means for supplying a plurality of different drive energies successively to the ink jet print head;

second means for monitoring temperature of the ink jet print head according to supply of the drive energy in each supply of the plurality of different drive energies;

third means for judging a threshold drive energy required for ejection of the ink jet print head using a value for each supplied drive energy and a value for each monitored temperature;

fourth means for determining a drive condition for ejecting ink on the basis of the threshold drive energy; and

fifth means for changing the drive energy applied to the print element of the ink jet print head on the basis of the determined drive condition.

8. (Amended) An ink jet print apparatus according to claim 7, wherein a change in each drive energy supplied to the ink jet print head is performed by changing a pulse width of a drive pulse signal applied to the print element.

9. (Amended) An ink jet print apparatus according to claim 7, wherein an initial drive energy supplied by said first means is determined on the basis of drive condition information stored in the ink jet print head.

10. (Amended) An ink jet print apparatus according to claim 7, wherein said fifth means compares the determined drive condition with drive condition information stored in the ink jet print head, and when both are different, changes the drive energy to drive the print element.

11. (Amended) An ink jet print apparatus according to claim 7, wherein said fifth means, when the determined drive condition is different from drive condition information stored in the ink jet print head, updates the drive condition information stored in the ink jet print head with the determined drive condition data.

12. (Amended) An ink jet print apparatus wherein a print element is driven to eject an ink from an ink jet print head for performing printing, the ink jet print apparatus comprising:

first means for supplying a plurality of different drive energies successively to the ink jet print head;

second means for monitoring temperature of the ink jet print head according to supply of the drive energy in each supply of the plurality of different drive energies;

third means for determining a drive condition for ejecting ink using a value for each supplied drive energy and a value for each monitored temperature; and

fourth means for changing the drive energy applied to the print element of the ink jet print head on the basis of the determined drive condition.

13. (Amended) An ink jet print apparatus wherein a memory for storing drive condition data is provided on an ink jet print head, by driving a print element an ink is ejected from the ink jet print head to a printing medium for performing printing, the ink jet print apparatus comprising:

first means for supplying a plurality of different drive energies successively to the ink jet print head;

second means for monitoring temperature of the ink jet print head according to supply of the drive energy in each supply of the plurality of different drive energies;

third means for judging a threshold drive energy required for ink ejection of the ink jet print head using a value for each supplied drive energy and a value for each monitored temperature;

fourth means for determining a drive condition for ejecting ink on the basis of the threshold drive energy; and

fifth means for comparing the determined drive condition with drive condition information stored in the ink jet print head and, when both are different, updating drive energy information stored in the memory of the ink jet print head with the determined drive condition data.

14. (Amended) An ink jet print apparatus according to claim 13, wherein the memory provided on the ink jet print head is an EEPROM.

15. (New) A method for controlling the drive energy of an ink jet print apparatus according to claim 1, wherein energy supply to the ink jet print head is made by applying drive signals to heat generation elements of the ink jet print head.

16. (New) An ink jet print apparatus according to claim 7, wherein energy supply to the ink jet print head is made by applying drive signals to heat generation elements of the ink jet print head.

REMARKS

Reconsideration and withdrawal of the rejection set forth in the above-mentioned Official Action in view of the foregoing amendments and the following remarks are respectfully requested.

Claims 1-16 are now pending in the application, with Claims 1, 6, 7, 12 and 13 being independent. Claims 1-14 have been amended and Claims 15 and 16 have been added herein.

Claims 1-14 were rejected under 35 U.S.C. § 102 as being obvious by U.S. Patent No. 5,576,745 (Matsubara). This rejection is respectfully traversed.

Each of independent Claims 1, 6, 7, 12 and 13 recites, inter alia, supplying a plurality of different drive energies successively to an ink jet print head and monitoring temperature of the ink jet print head according to supply of the drive energy in each supply of the plurality of different energies.

Matsubara is directed to a recording apparatus that can determine a thermal change state of a mounted thermal head and a driving condition of the mounted head. As understood by Applicant, Matsubara teaches, for example, a recording apparatus in which a heater is driven for a predetermined time (3 seconds), a temperature rise of the ink jet head is measured after another predetermined time (0.1 seconds, Fig. 7), and a standard drive pulse width of the ink jet head which corresponds to the temperature rise is read out from a pre-stored table. Fig. 15 of Matsubara depicts a conventional double pulse for executing one ejection operation. However, there is no disclosure in Matsubara of measuring the temperature after each pulse in this double pulse.

Accordingly, Matsubara fails to disclose or suggest at least supplying a plurality of different drive energies successively to an ink jet print head and monitoring temperature of the ink jet print head according to the supply of the drive energy in each

supply of the plurality of different drive energies, as is recited in each of independent Claims 1, 6, 7, 12 and 13.

Accordingly, Matsubara fails to disclose or suggest important features of the present invention recited in the independent claims.

Thus, independent Claims 1, 6, 7, 12 and 13 are patentable over the citations of record. Reconsideration and withdrawal of the § 103 rejection are respectfully requested.

For the foregoing reasons, Applicant respectfully submits that the present invention is patentably defined by independent Claims 1, 6, 7, 12 and 13. Dependent Claims 2-5, 8-11 and 14-16 are also allowable, in their own right, for defining features of the present invention in addition to those recited in their respective independent claims. Individual consideration of the dependent claims is requested.

Applicant submits that the present application is in condition for allowance. Favorable reconsideration, withdrawal of the rejection set forth in the above-noted Office Action, and an early Notice of Allowance are requested.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

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